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INTEGRATED PRODUCT AND PROCESS DEVELOPMENT (IPPD)

"IPPD is a management technique that simultaneously integrates all essential acquisition activities through the use of multi-disciplinary teams to optimize the design, manufacturing, and supportability process. … IPTs are the key to making IPPD work."

Secretary of Defense Memo of 10 May 1995

4.1 BACKGROUND

In order to lay the groundwork for Integrated Product and Process Development and Integrated Product Teams (IPTs), a brief discussion of related events is presented that tends to justify the decision to employ IPPD and show their relevance to the current business environment and the DoD acquisition process.

4.2 GLOBAL CHANGES

To a great extent, this topic deals with human skills, organizational changes, and team leadership. These are areas that have been significantly impacted by recent changes in the global environment brought about by shifts in technology, markets, labor, production, organizational focus, management emphasis, and organizational structure. Examples of each shift includes automated computational-based technologies, rapidly changing markets, management's focus on customers, a shift from an emphasis on employee control to an emphasis on flexibility, and organizations shifting to horizontal team-oriented structures. Today, because of these global business changes, organizations focus outward — external, individual performance is based on continual improvement; the relationship of workers is now team-oriented; and a leadership style, based on worker empowerment, is used. Similar changes are also occurring in the DoD.

4.3 CHANGES IN DOD

Since the late 80s and, particularly, in the 90s, DoD has undergone deep budget and personnel reductions that have resulted in major changes in acquisition management — fewer dollars, fewer people, and fewer programs. Thus, DoD cannot begin to afford to conduct the acquisition business using the processes applicable to the period prior to 1992. For these reasons, combined with the changes in the global business envi-

ronment, DoD acquisition management needs to be even more effective in its leadership while achieving new levels of flexibility and adaptability.

4.4 LEADERSHIP AND MANAGEMENT STYLE

As these global and DoD changes have occurred, a style known as team leadership has been effective. The team leader tends to place emphasis on building trust and inspiring teamwork, facilitating and supporting team decisions, expanding team capabilities, creating a team identity, making the most of team differences, and foreseeing and influencing change. This leader, in the form of an acquisition manager, operates in a framework that is affected by the global and DoD-wide changes created by industry and government downsizing. Leaders have to be proactive in setting the direction for their programs, aligning their people to the purpose of the program, and motivating those within the program office and the functional personnel who are part of the program management team. See Table 4A (at the end of this Chapter) for a list of characteristics of effective teams.

4.5 PARADIGMS

Paradigms are the models we use to screen incoming data. They influence our perceptions and judgments. We see best what matches our paradigms. Problems arise when the incoming data do not match the expectations that are created by our paradigms. As a result, we become blind to new opportunities because they do not fit our paradigms.

What are the recent paradigm changes that will have an impact upon leaders and managers in the acquisition management business? Experts have identified seven paradigm changes that are necessary for success in the 1990s. Briefly these changes are:

- quality redefined,
- continuous improvement,
- people make the difference,
- process improvement versus results,
- system thinking,
- horizontal structure, and
- teams as a system.

4.6 ORGANIZATIONS

Organizations that have not adapted to the paradigms noted previously have been classified by certain authors as "stuck" organizations. These organizations are internally driven; they make their decisions based on professional or departmental interest and not on updated information about customers' changing needs. They are also functionally focused and organized as a collection of separate functional departments or "stove pipes," which waste time and energy competing with each other for resources and rewards. The overall impact of this functional focus is reduction in quality and increase in cycle times and costs. Finally, stuck organizations are management-centered. The managers see themselves as the key players in the organization and assume a need to control almost everything. At times, this results in workers being denied the information, skills, experience, and authority they need to make improvements to the processes they are responsible for.

In contrast, organizations that have adapted to the above-noted paradigm of the 1990s have been referred to as "moving" organizations. They are customer-driven, so they can quickly and continuously understand, meet, and exceed their customers' changing expectations. They are also process-focused. They bridge the gaps between functional departments by understanding, tracking, improving, and speeding up the work processes by moving horizontally across the organization. Finally, moving organizations recognize the world is moving too quickly for managers to know enough, fast enough, about enough things, to consistently make the right decisions, to masterfully control situations, and to keep the organization from being swamped. Therefore, moving organizations become employee-involved. They undertake a systematic effort to build and benefit from the knowledge, skills, and commitment of their nonmanagers. Because of their closeness to work processes and the customer and because of their sheer numbers, nonmanagers can know enough, fast enough, to improve work processes.

The above organizational definitions and paradigm changes have brought about a need for leaders and managers to change their roles to some extent. In a traditional environment, managers determined and planned the work and "best methods," narrowly defined jobs, viewed cross-training as inefficient, regarded information as "management property," focused nonmanagerial training on technical skills, and discouraged risk taking. However, in the team environment, managers and team members jointly determine and plan the work, jobs require broad skills and knowledge, cross training is the norm, and most information is freely shared at all levels. Figure 4-1 offers a more complete comparison of the two organizational environments.

4.7 TRADITIONAL AND TEAM ENVIRONMENTS AND LEADERSHIP SKILLS

We should now begin to think of IPPD and IPTs in the context of the prior discussions, while considering the characteristics of three types of leadership skills. Addressed below, are the leadership skills that define a supervisory leader, a participative leader, and a team leader.

Traditional Environment	Team Environment
• Managers determine and plan the work.	• Managers and team members jointly determine and plan the work.
• Jobs are narrowly defined.	• Jobs require broad skills and knowledge.
• Cross-training viewed as inefficient.	• Cross-training is the norm.
• Most information is "management property."	• Most information is freely shared at all levels.
• Training for nonmanagers focuses on technical skills.	• Continuous learning requires interpersonal, administrative, and technical training for all.
• Risk taking is discouraged and punished.	• Measured risk-taking is encouraged and supported.
• People work alone.	• People work together.
• Rewards are based on individual performance.	• Rewards are based on individual performance and contributions to team performance.
• Managers determine "best methods."	• Everyone works to continuously improve methods and processes.

Figure 4.1: Comparison of Organizational Environments

The supervisory leader is skilled in directing people, explaining decisions, training individuals, managing one-on-one, containing conflict, and reacting to change. This type of leader emphasizes the top-down authority of a position and is effective in a traditional environment; but this person is less successful in a team environment. The participative leader has skills to work with employees rather than dictate to them. This type of leader involves people, gets their input for decisions, develops individual performance, coordinates group effort, resolves conflict, and implements change. The team leader moves away from the "control" world and focuses on building shared commitment, responsibility, and leadership. This type of leader builds trust and inspires teamwork, facilitates and supports team decisions, expands team capabilities, creates a team identity, makes the most of team differences, and foresees and influences change.

4.8 INTEGRATED PRODUCT AND PROCESS DEVELOPMENT (IPPD) AND INTEGRATED PRODUCT TEAMS (IPTs)

DoDD 5000.1, of 15 March 1996, states in part, " PMs and other acquisition managers shall apply the concept of IPPD throughout the acquisition process to the maximum extent practicable. … At the core of IPPD implementation are Integrated Product Teams (IPTs)."

IPTs, sometimes called cross-functional teams, have thus become increasingly common in program management within DoD. IPTs are the heart of IPPD, a philosophy that produces an effective and efficient product that satisfies customers' needs. It systematically employs a teaming of functional disciplines to integrate and concurrently apply all necessary processes. In DoD 5000.2-R, the IPPD definition states, " One of the key IPPD tenants is multi-disciplinary teamwork through Integrated Product Teams (IPT)."

IPTs apply and build on subjects discussed before in terms of global change, team leadership, needed paradigm changes for the 1990s, moving organizations, and a team environment with a team-type leader. In addition they:

- reduce cycle times by replacing serial development with parallel development;
- facilitate reaching solutions to complex problems that transcend different disciplines and functions;
- focus the organization's resources on satisfying the customer's needs;
- provide a creative mix of people with different backgrounds, orientations, cultural values, and styles, which increases the probability of new ideas and innovations;
- provide opportunities for members to develop new technical and professional skills, learn about other disciplines, and learn how to work with people who have different styles and backgrounds; and
- provide a place where people can go for information and for decisions about a project, program, or customer.

In spite of their proliferation and advantages, some IPTs fail because senior managers do not give the team leaders training in critical interpersonal, group process, and team leadership skills. Sometimes team members are not empowered by their supervisors to fulfill their role as an IPT member. Some offices attempt to exert oversight authority in an older style of management when they really do not have oversight authority. Some offices with oversight authority over-reach their authority in violation of the spirit of IPPD and IPTs. Many technically trained professionals lack the experience of working effectively in groups. In fact, many scientists and engineers chose their profession because it

involved working independently with minimal supervision and interpersonal contact. However, as the number of IPTs increase, these professionals are being selected as IPT leaders. At a minimum, IPT leaders should be proficient in the IPT leadership elements including:

- group process skills,
- leadership empowerment,
- flexibility,
- conflict resolution,
- stakeholder relationships,
- resource allocation, and
- communications coordination.

4.9 IPPD/IPT AND LOGISTICS

As noted above, IPPD involves multidisciplinary teamwork through IPTs. Thus, the first job in a logistics IPT, is to define its membership and who is responsible for what! An acquisition logistics IPT employing "best practices" could organize as follows:

- *Purpose:* Optimize system support.
- *Activities:* Prepare/coordinate logistics plans and activities.
- *Typical team members include:*
  - government and contractor logistics managers;
  - design engineers and testers;
  - logistics element representatives;
  - users and training commands; and
  - others as necessary (cost, contacts, etc.).

Table 4A (at the end of this Chapter) lists many of the attributes of an effective team. Having established a purpose and defined its membership, the logistics IPT will logically

need to address in greater detail its activities and related actions. These functions should include:

- **working with** the users to define their logistics constraints and requirement in the Mission Need Statement and Operational Requirements Documents;
- **identifying**/**defining,** through supportability analyses and other tools, the logistics support requirements for each proposed design alternative (normally done in a logistics support plan or equivalent);
- **advocating** selection of the most cost-effective, supportable system from among design alternatives;
- **influencing** detailed design decisions toward a more cost-effective, supportable design;
- **refining** logistics support plans at the same pace and depth at which the concurrent engineering team is working;
- **fostering** test and evaluation of the system and logistics support to the maximum practicable extent;
- **acquiring** all necessary items of support (previously identified in the logistics support plan) concurrently with system acquisition;
- **providing** the system and all its requisite support to users in the right places, at the right time, and in the right quantities throughout its service life; and
- **improving** logistics support through the inevitable modification, change, and improvement process.

4.10 SUMMARY

In conclusion, IPPD and IPTs have origins in the new paradigms of the 1990s that have presented the case for organizations to change from "stuck" organizations to "moving" organizations. At the same time, the organizational environments have changed from a traditional to a team environment. This has made it necessary for leaders to change their style from supervisory; to participative; and, then, to team leader. IPTs can take advantage of these changes while employing the noted and implied team and leadership skills to enhance their performance, in general, and logistics IPTs, in particular.

TABLE 4A
CHARACTERISTICS OF AN EFFECTIVE TEAM

1. Has a clear understanding of its purpose and goals.

2. Is flexible in selecting its procedures as it works toward its goals.

3. Has achieved a high degree of communication and understanding among its members. Communication of personal feeling, attitudes, as well as ideas occurs in a direct and open fashion because they are considered important to the work of the group.

4. Is able to initiate and carry on effective decision making, carefully considering minority viewpoints and securing the commitment of all members to important decisions.

5. Achieves an appropriate balance between group productivity and the satisfaction of individual needs.

6. Provides for sharing of leadership responsibilities by group members. By sharing leadership responsibilities, all members are concerned about contributing ideas, elaborating and clarifying the ideas of others, giving opinions, testing the feasibility of potential decisions, helping the group work on its tasks, and maintaining itself as an effective working unit.

7. Has a high degree of cohesiveness (attractiveness for the members) but not to the point of stifling individual freedom and submerging individual differences.

8. Makes intelligent use of the different abilities of its members.

9. Is not dominated by its leader or any of its members.

10. Can be objective about reviewing its own processes and can face its problems and adjust to needed modifications in its operations.

11. Maintains a balance between emotional and rational behavior and channels emotions into productive group effort.

Source: *The Leader Looks at Group Effectiveness,* Gordon L Lippitt and Edith W. Seashore. Leadership Resources, Inc., Fall Church, VA, 1976